

**Janki Devi Bajaj Government Girls College Kota**



**Industrial Visit Report**

**On**

**Kota Thermal Power Plant and its Impact on  
Environment**

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**Object: Environmental impact assessment of the Kota thermal power plant: A study on pollution and mitigation measures**

**Introduction:**

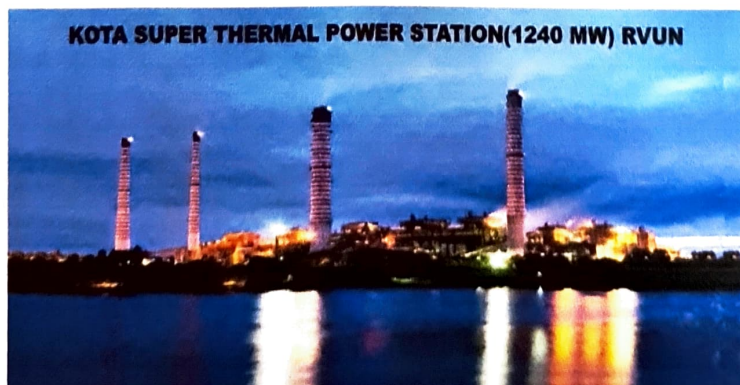
**Location & Area:** Kota Super Thermal Power Station is located on the left bank of Chambal River in Kota, Rajasthan. Its total land area is approx. 250 Acres

**Capacity:** The Kota Thermal Power Plant has a total installed capacity of 1240 megawatts (MW), divided into two stages: Stage I and Stage II. Stage I consists of units 1 to 7, each with a capacity of 110 MW, while Stage II consists of units 8 and 9, with a capacity of 195 MW each. Thus, the power plant has a total of nine units.

**Fuel Used:** The power plant primarily relies on coal as its fuel source for power generation. The coal used is sourced from nearby coal mines, coal India Ltd supply coal from its coal producing company BCCL, SECL ECL .The coal is transported to the power plant via rail or road and undergoes various processes, including coal handling, pulverization, and combustion in the boilers.

**Source of Water:** The source of water for power station is reservoir formed by the Kota barrage on the Chambal River,

The Kota Thermal Power Plant plays a significant role in meeting the electricity demands of the state of Rajasthan and the northern region of the country. The power plant is owned and operated by the Rajasthan Rajya Vidyut Utpadan Nigam Ltd. (RVUNL). It has been an important contributor to the energy infrastructure of Rajasthan and the surrounding region. It has played a vital role in meeting the increasing power demands of industries, households, and agriculture. The plant has also contributed to economic development and job creation in the area.



## Observation:

During this Industrial visit we observe the layout of KTPS and understand the Power generation process from coal and its impact on environment.

## Main Parts of the Plant

| Name of part        | Action of part  |
|---------------------|---|
| Coal Handling Plant | The coal handling plant is located near the railway sidings and is responsible for the receiving, unloading, storing, and conveying of coal to the power plant.   |
| Boiler and Furnace: | The boilers and furnaces are where the combustion of coal takes place. They are designed using supercritical technology, ensuring efficient and cleaner coal combustion. The heat generated from the combustion process is used to convert water into steam.                  |
| Steam Turbines      | The steam turbines are connected to the generators and are driven by the high-pressure steam produced in the boilers. The turbines convert the energy from the steam into mechanical energy, which is then used to rotate the generators and generate electricity.            |
| Generators          | The generators are responsible for converting the mechanical energy from the steam turbines into electrical energy. The electricity generated is then fed into the power grid for distribution.   |
| Cooling Towers      | The cooling towers are used to cool down the hot water coming out of the condenser after it has passed through the turbines. The towers facilitate the removal of excess heat by allowing the water to come into contact with the ambient air, thus reducing its temperature. |
| Ash Handling Plant  | The ash handling plant deals with the disposal and utilization of ash generated from the combustion process. It includes systems for ash collection, storage, and disposal. The ash can be utilized in various industries, such as cement and brick manufacturing.            |
| Chimneys            | The power plant has tall chimneys that serve the purpose of releasing the combustion gases and emissions into the atmosphere at a sufficient height to minimize their impact on the surroundings.   |

## POLLUTION CONTRIBUTION

The operation of the Kota Thermal Power Plant, like other thermal power plants, contributes to various forms of pollution. The main types of pollution associated with the plant include:

**Air Pollution:** The combustion of coal in the boilers releases a significant amount of air pollutants, including sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), particulate matter (PM), and carbon dioxide (CO<sub>2</sub>). These pollutants can have adverse effects on air quality, leading to respiratory issues, smog formation, and contributing to climate change.



**Water Pollution:** The power plant requires a large amount of water for cooling purposes. The hot water discharged from the cooling towers into nearby water bodies can raise the temperature of the receiving water, which can have detrimental effects on aquatic ecosystems and fish populations. Additionally, improper handling and disposal of coal ash can result in the contamination of nearby water sources.



**Ash and Solid Waste Disposal:** The combustion of coal produces ash and other solid waste, which need to be properly managed. If not managed effectively, the ash can contaminate soil and water resources, affecting local ecosystems and potentially causing harm to human health.



**Land Degradation:** Coal mining, transportation, and storage activities associated with the power plant can lead to land degradation, including deforestation, soil erosion, and habitat destruction. These activities can have long-term ecological consequences and affect the local biodiversity.



**Noise Pollution:** The operation of large machinery and equipment, such as boilers, turbines, and cooling systems, can generate significant noise levels. This noise can impact the surrounding environment and nearby residential areas, potentially causing disturbances and affecting the well-being of residents.

## Mitigation Measures for Pollution Reduction at Kota Thermal Power Plant:

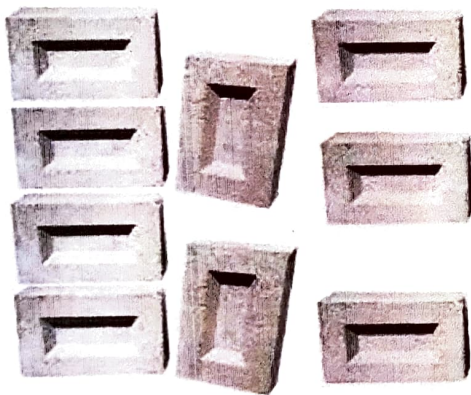
Efforts are being made by power plants, including the Kota Thermal Power Plant, to mitigate these environmental impacts and reduce pollution. This includes the adoption of cleaner technologies, such as the use of better emission control systems and the implementation of ash utilization practices. Additionally, stricter environmental regulations and monitoring are being enforced to ensure compliance and minimize the plant's environmental footprint.

It's important to note that pollution levels and the effectiveness of pollution control measures may vary over time and depend on the specific operational practices and investments made by the power plant.

To mitigate pollution from the Kota Thermal Power Plant, several steps have been taken to minimize its environmental impact. Some of these steps include:

**Installation of Pollution Control Equipment:** The power plant is equipped with advanced pollution control devices such as electrostatic precipitators (ESPs) and flue gas desulfurization (FGD) systems. ESPs help in removing particulate matter (PM) from the flue gases, while FGD systems reduce sulfur dioxide (SO<sub>2</sub>) emissions by scrubbing the flue gases.

**Ash Utilization:** The power plant focuses on ash utilization, where the ash generated during the combustion process is collected, stored, and utilized in various industries such as cement and brick manufacturing and in farming as pesticide. This helps in reducing the amount of ash that would otherwise be disposed of, minimizing the environmental impact.



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**Water Conservation:** Efforts are made to conserve water and minimize its consumption within the power plant. Water recycling and reuse systems are implemented to reduce the overall water demand. Additionally, measures are taken to ensure the proper treatment of wastewater before its discharge.

**Environmental Monitoring:** The power plant conducts regular monitoring of air, water, and soil quality in and around the plant premises. This monitoring helps in identifying any deviations from the prescribed standards and taking appropriate corrective actions to minimize pollution.

**Compliance with Environmental Regulations:** The Kota Thermal Power Plant complies with the environmental regulations set by the Central Pollution Control Board (CPCB) and other regulatory

authorities. Regular inspections and audits are conducted to ensure adherence to the prescribed emission limits and environmental norms.

**Adoption of Cleaner Technologies:** The power plant is continuously exploring and implementing cleaner technologies to reduce pollution. This includes the use of more efficient combustion techniques, the installation of advanced emission control systems, and the exploration of cleaner fuel alternatives.

**Afforestation and Green Belt Development:** Efforts are made to create green belts and promote afforestation around the power plant area. Planting trees helps in reducing the impact of air pollution by acting as natural air filters and providing a healthier environment.

**Public Awareness and Engagement:** The power plant conducts awareness programs and engages with the local community to educate them about the environmental measures taken and the importance of pollution control. This promotes a sense of responsibility among stakeholders and encourages their active participation in environmental conservation efforts.

### **Conclusion :**

Apart from power generation, the Kota Thermal Power Plant also focuses on environmental sustainability. The power plant has implemented measures for ash utilization, where the ash produced during the combustion process is utilized in the manufacture of bricks, cement, and construction materials. Efforts are made to minimize the environmental impact of the plant through proper ash handling and dust control systems.

However, like other coal-based power plants, the Kota Thermal Power Plant faces challenges related to environmental impact, including air pollution and carbon emissions. Efforts are being made to address these challenges through the adoption of cleaner technologies and the integration of renewable energy sources.

In conclusion, the Kota Thermal Power Plant is a significant coal-based thermal power station in Kota, Rajasthan, catering to the electricity needs of the region. It employs advanced technology, emphasizes environmental sustainability, and contributes to the overall energy infrastructure and socio-economic development of the area.